(12) UK Patent Application (19) GB (11) 2 230 565 (13) A

(43) Date of A publication 24.10.1990

(21) Application No 8901448.4

(22) Date of filing 24.01.1989

(51) INT CL[5]
F03D 1/04

(52) UK CL (Edition K)
F1T TC T102 T131 T149 T311
U1S S1999 S2081

(56) Documents cited
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(58) Field of search
UK CL (Edition J) F1T
INT CL[4] F03D 1/00 1/04

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(54) Axial flow wind turbine

(57) An axial flow wind turbine comprises a casing (a), stator blades (c), rotor blades (d) and electric generator casing (e). An annular disc portion (g) generates a low pressure downstream of the device as a result of air flowing outside the casing.

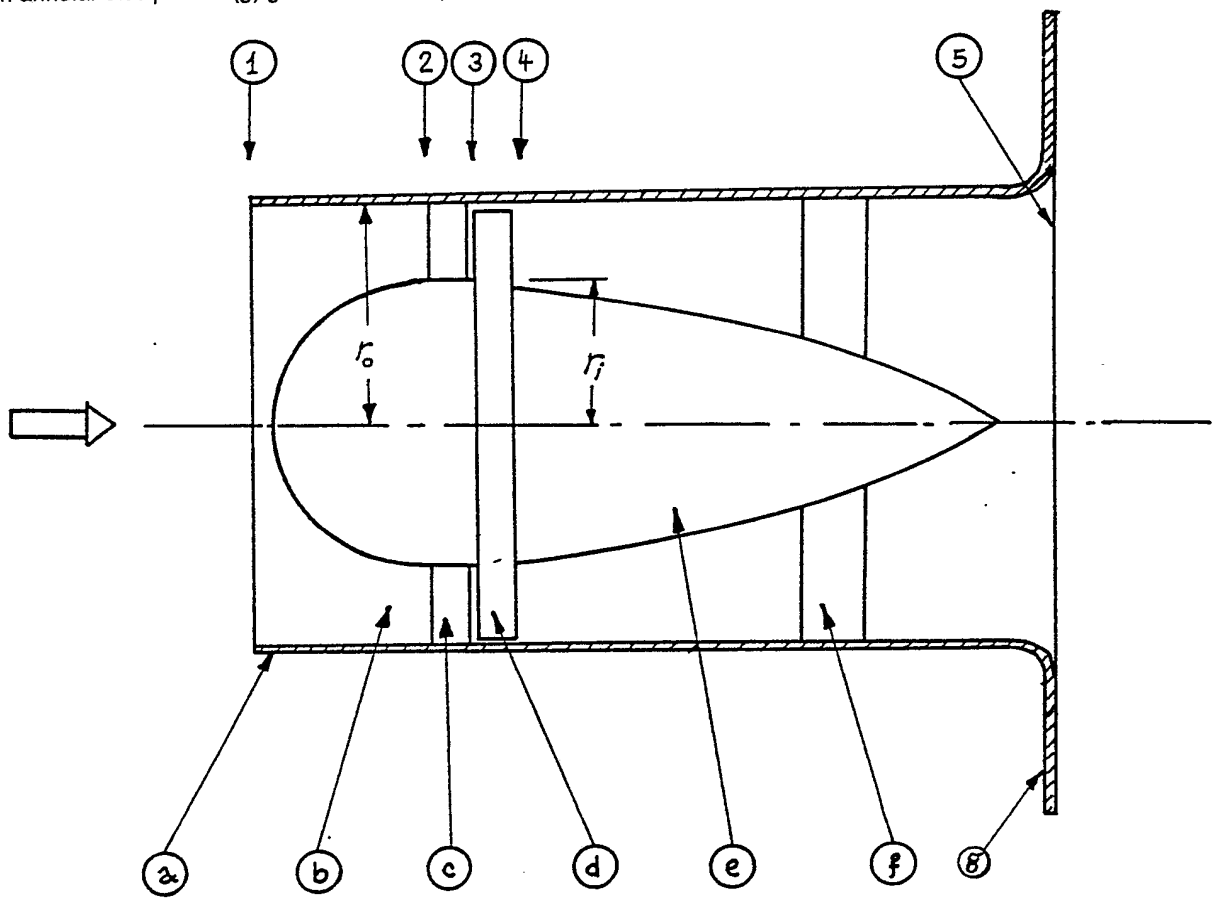

Fig. 1: Cross Sectional View.

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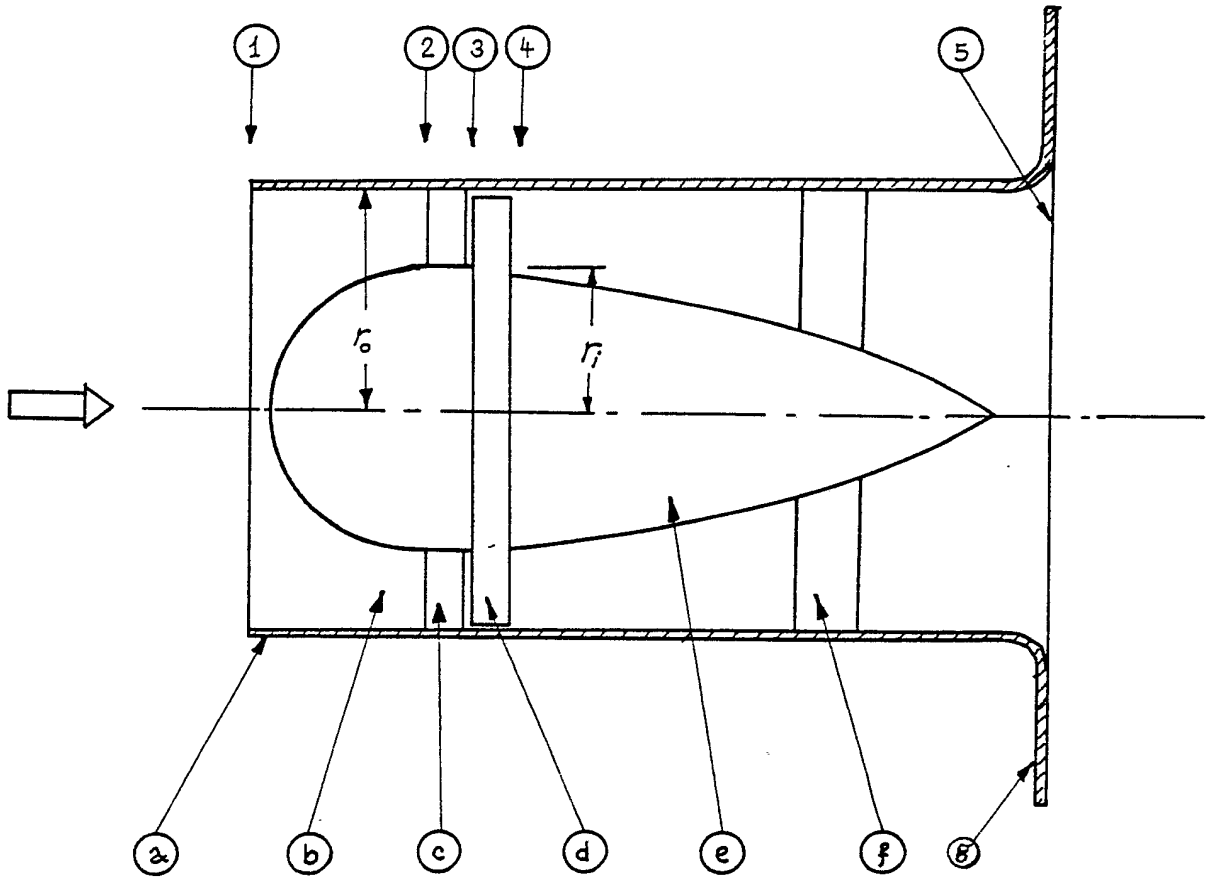
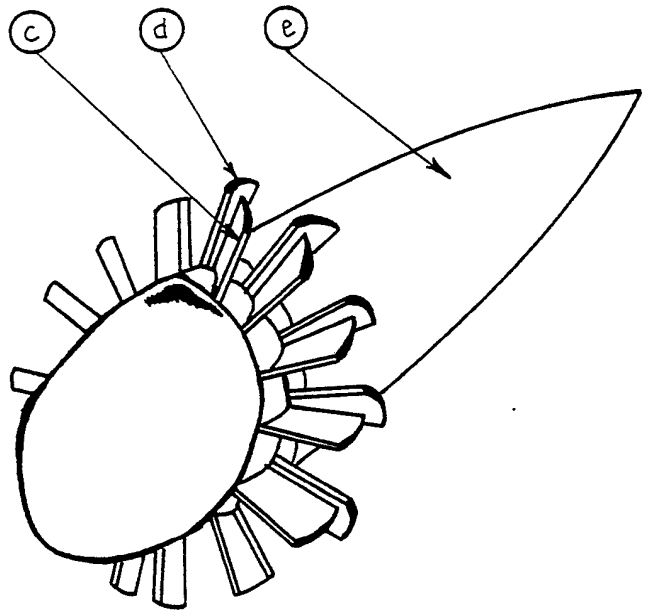


Fig. 1: Cross Sectional View.



a- Casing for Nozzle, Turbine and Diffuser.
b- Inlet Nozzle.
c- Guide Vanes.
d- Rotor Blades.
e- Electric Generator casing.
f- Supports for electric generator casing.
g- Wind Barrier building pressure drop.

Fig. 2: General View without outer casing.

AXIAL FLOW TURBINE DESIGN FOR WIND POWER.

This invention relates to the use of axial flow turbine to harness wind energy.

Wind Energy Conversion Systems mainly include single-bladed, double-bladed, multibladed propeller type turbines, the Savonius turbine, the Darrieus turbine, and many other similar turbines.

According to the present invention the axial flow turbine is also to be used as a design to harness wind energy. This axial flow turbine is surrounded by a cylindrical casing and at its rear edge there is a wind barrier. The axial flow turbine is fixed on a central aerofoil profile.

A specific embodiment of the invention will now be described by way of example with reference to the accompanying drawing in which:-

Figure 1 shows a cross sectional view;

Figure 2 shows a general perpective view without outer casing.

Referring to the drawing the axial flow turbine comprises a casing for nozzle, turbine and diffuser (a) and at the rear end is a wind barrier building pressure drop (g) in the form of a disc.

Air entering the casing (a) will face the central aerofoil profile which is the electric generator casing (e), then air will obtain a higher velocity and lower pressure. Next air will pass through the guide vanes (c) then will rotate the rotor blades (d). This rotating rotor will translate wind energy into useful kinetic energy.

Air will then lose speed in the diffuser and gain some pressure to meet ambient air behind the casing (a) at the same pressure.

While air moving also parallel to the turbine axis but outside the casing (a) will face the wind barrier building pressure drop (g); and a pressure drop is set up behind the overall design.

CLAIMS

1 The use of axial flow turbine to harness energy from wind energy. Axial flow turbine having a stage reaction of less than 100% or above. The axial flow turbine comprises stable inlet guide vanes, rotating rotor blades, and surrounded by an outer casing.

2 The axial flow turbine as claimed in Claim 1 is fixed over a central aerofoil profile having a symmetrical cross section around the central axis of the turbine. The axial flow turbine is fixed at the maximum diameter of the aerofoil profile. In front of the axial flow turbine is a nose fairing shape, which is part of the aerofoil profile. A fairing length/diameter ratio of 0.5 to 0.75.

3 The axial flow turbine as claimed in Claim 1 can be surrounded from outside its casing by a wind barrier building a pressure drop (Δp) behind it not more than 1.6 times the drag coefficient (C_D) of the wind barrier times the velocity head of the incoming air ($V^2/2$); i.e. $\Delta p/\rho \leq 1.6 * C_D * V^2/2$. (ρ is air density).

AMENDMENTS TO THE CLAIMS.

1. The use of axial flow turbine to harness wind energy. The axial flow turbine comprises stable inlet guide vanes, rotating rotor blades, and surrounded by an outer simple cylindrical casing, having no variation in thickness, this same cylindrical casing extend downwind side to form the diffuser wall.

This axial flow turbine is fixed over a central aerofoil profile having a symmetrical cross section around the central axis of the turbine. The axial flow turbine is fixed at the maximum diameter of the aerofoil profile. The central aerofoil profile can be used as a casing for an elactric generator.

The axial flow turbine is surrounded from outside its casing by a wind barrier, taking the shape of a disc, which is perpendicular to the axis of the axial flow turbine, and building a pressure drop behind it.

The overall design of the axial flow turbine depend on the pressure drop offered by the wind barrier to the flow of air moving parallel to the turbine axis but outside turbine casing.

2. A wind turbine constructed and arranged to operate substantially as described with reference to and as illustrated in the accompanying drawings.

Published 1990 at The Patent Office, State House, 66 71 High Holborn, London WC1R 4TP. Further copies may be obtained from The Patent Office Sales Branch, St Mary Cray, Orpington, Kent BR5 3RD. Printed by Multiplex techniques ltd. St Mary Cray, Kent, Con. 1/87

PUB-NO: GB002230565A

DOCUMENT-IDENTIFIER: GB 2230565 A

TITLE: Axial flow wind turbine

PUBN-DATE: October 24, 1990

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APPL-NO: GB08901448

APPL-DATE: January 24, 1989

PRIORITY-DATA: GB08901448A (January 24, 1989)

INT-CL (IPC): F03D001/04

EUR-CL (EPC): F03D001/04

US-CL-CURRENT: 415/220

ABSTRACT:

CHG DATE=19990617 STATUS=O> An axial flow wind turbine comprises a casing (a), stator blades (c), rotor blades (d) and electric generator casing

(e). An annular disc portion (g) generates a low pressure downstream of the device as a result of air flowing outside the casing. □